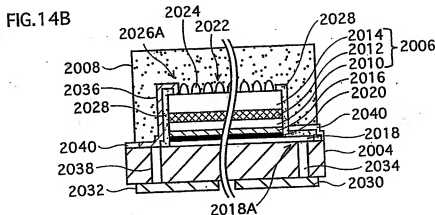


REMARKS

The Office Action rejected Claim 38 under 35 U.S.C. §112 and raised an issue as to the enablement by a first conductive layer as a p-type semiconductor layer and a second conductive layer as an n-type semiconductor layer.

The Office Action noted the embodiment of Figure 2A described in Paragraph 0082. Applicant would bring the Examiner's attention to the embodiment of Figure 14B as follows:



Referring to Paragraph 0146, a p-layer 2010 and an n-layer 2014 is taught. In addition, the n-layer 2014 has a main surface of an uneven configuration to improve the light extraction efficiency as described in Paragraph 0150 as follows:

“Here, depressions 2022 are formed in the upper main surface of the layer 2014 to improve extraction efficiency.”

Consistent with this disclosure, applicant has redrafted Claim 39 as an independent claim without adding any new matter. Claim 39 now incorporates the subject matter of Claim 35 and dependent Claim 38 in the underlined portion of Claim 39 (amended).

Accordingly, applicant would request reconsideration of the rejection under 35 U.S.C. §112.

Applicant appreciates the detailed analysis with regards to Claim 43 and acknowledges that there is a typographical error as noted by the Examiner. This issue, however, is moot since applicant, pursuant to 37 CFR §1.116, has now cancelled Claims 42-45 to narrow the issues in order to place the case in condition for allowance or alternatively, to have this Rule 116 Amendment entered for purposes of appeal.

The Office Action rejected Claims 35-36 and 38-42 over a combination of *Nagai et al.* (U.S. Patent Publication No. 2006/0180818) in view of *Durocher et al.* (U.S. Patent No. 6,614,103) and *Baretz et al.* (U.S. Patent No. 6,600,175).

The *Nagai et al.* reference represents a joint invention with the present inventor having a prior art date of July 22, 2004. The present invention has a priority date of August 28, 2003 and applicant has prepared certified translations of the priority documents to moot the rejection of Claims 35-42 as follows:

JP 2003-305402
JP 2003-340020
JP 2004-026851

The Office Action further rejected Claims 35-41 as being unpatentable over a combination of *Durocher et al.* in view of *Baik et al.* (U.S. Patent Publication 2004/0108511) when taken in view of *Baretz et al.* (U.S. Patent No. 6,600,175).

The *Durocher et al.* reference taught a flexible plastic packaging of LED arrays by mounting rigid carriers 21 onto a thin film flexible base 41 such as a plastic sheet as taught in Column 5, Lines 17-31. The base is preferably a prefabricated structure with electrodes 49 extending through the flexible base.

Accordingly, *Durocher et al.* does not teach the formation of multilayer epitaxial structure as formed on our base substrate, and as shown for example in Figure 2A and Figure

14B of our disclosure. Rather, *Durocher et al.* teaches a rigid carrier 21 and as can be seen in Figure 7, provides bonding pads 61 for adhering a multilayer epitaxial structure on top of the bonding pads that in turn are positioned on top of the rigid carrier which in turn is mounted through a vertically conductive adhesive 53 to a flexible base 41. These features are consistent with the stated purpose of the *Durocher et al.* reference, mainly to provide a flexible circuit module that can be bent into different desirable shapes while still supporting LEDs through a rigid carrier. See Column 3, Lines 10-30.

An isotropic conductive adhesive that only electrically conducts, for example along the vertical or Z axis is provided between a rigid carrier and the flexible base as taught in Column 5, Line 63 to Column 6, Line 3.

The Office Action recognizes that the specific multilayer epitaxial structure is not shown in the *Durocher et al.* reference. It suggests, however, that Figure 2 of the *Baik et al.* publication could be relied upon to teach our epitaxial structure.

The *Baik et al.* reference would suggest to a person of ordinary skill in this field the advantages of a composite reflective layer provided on the back of an apparent transparent substrate such as a sapphire substrate 2 in the prior art shown in Figure 1. The reflective layer has a core of aluminum 35 and is sandwiched with a first alumina layer (Al_2O_3) to help provide an adhering surface to the sapphire substrate and a second bottom protective layer of aluminum oxide completes the reflective structure.

The *Baik et al.* reference teaches a first n-clad layer 24 directly on the substrate 22, an active layer 26 on the n-type clad layer 24, and a second p-type clad layer 28 formed on the surface of the active layer 26. Electrode contact pad 31 on the n-clad layer and p-contact pad 33 on the surface of the second p-clad layer 28 are also shown. See Paragraph 0036 to 0038.

In summary, a person of ordinary skill would be directed to the alleged improvement of the composite bottom reflective surface to improve the luminance of the LED of *Baik, et al.*

As can be appreciated, the LED structure of *Baik et al.* could not be substituted for the LED 59 shown in the *Durocher et al.* disclosure. The conductive adhesive 53 would not be appropriate even if the *Durocher et al.* reference was modified to remove the rigid carrier. More appropriately, bonding pads 61 shown in Figure 7 would not be appropriate for attachment to the protective aluminum oxide underside.

As can be appreciated, significant alterations would have to be undertaken in an attempt to replicate the present invention. The only template, however, for directions to make such alterations would be in hindsight from our present invention.

“When prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself.”

Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143 (Fed. Cir. 1985).

Additionally, neither the *Durocher et al.* nor the *Baik et al.* reference teaches the uneven main surface on an n-type semiconductor layer as defined, for example in Claim 39. Certainly there is no teaching of improving a light extraction efficiency in this manner. *Durocher et al.* addresses the light extraction by providing the side wall reflectors 57 on the slanted surfaces of the rigid carrier 31.

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994); see *KSR*, 127 S. Ct. at 1739-40 (explaining that when the prior art teaches away from a combination, that combination is more likely to be nonobvious). Additionally, a reference may teach away from a use

when that use would render the result inoperable. *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1354 (Fed. Cir. 2001).

In re Icon Health and Fitness, Inc. 2007 U.S. App. Lexis 18244,
*10

Of course the *Baik et al.* reference also teaches to improve the light efficiency by providing a reflector on the rear surface of the transparent substrate, but *Durocher et al.* uses the bonding pads 61 on the rear surface of its LEDs.

The *Baretz et al.* reference was basically cited for a feature of immersing the LED dies in a light emitting polymer 63 capable of down converting short wave length emissions of the LED array into white light. As noted in Column 12, Lines 25-38, there is no specific concern as to the configuration of the light emitting diodes since the *Baretz et al.* reference was seeking to teach the prior art how to utilize a short radiation emitting LED, for example in a blue or UV light range for the light emitting polymer 63 to provide a conversion of the radiation from the LED array into white light.

The embodiment cited in the Office Action of Figure 5 discloses a series of LEDs mounted on a conductive substrate 42, see Column 12, Line 3, with each of the LED dies 41 in electrical contact on its bottom surface. A single lead 44 passes to the exterior of the cell in a bottom wall member while the top faces of the LED dies are connected by a series connection of wires 43. See Column 12, Lines 2-11.

As shown in Figure 5, there are two side walls 48 and a transparent top wall member 49. See Column 11, Lines 58-65. The fact that a frame is filled with the phosphor film 63 only incidentally covers the side of the LEDs, since only the top cover 49 is transparent. The real teaching that a person of ordinary skill would appreciate is the use of special low wave length LEDs for interacting with a particular type of phosphor film for conversion to white light.

Needless to say, this reference does not resolve the deficiencies of the prior references such as the structural position and connections described in Claim 35.

In addition, the irregular or uneven n-type semiconductor layer in Claim 39 is certainly not found or taught in any of the references, including *Baik et al.* None of the references teach or suggest such a feature for improving a light extraction efficiency.

In summary, the *Durocher et al.* reference does not provide the structural claim elements set forth in Claim 35. It also does not teach a description of phosphors.

The *Baretz et al.* reference discloses phosphors, but the structure is significantly different from an LED device of our present claims.

The *Baik et al.* reference, which has a transparent substrate with bottom reflection film layers, discloses a structure that is significantly different from the LED of our present application. Additionally, the combination of these references do not suggest each of the elements defined in our current claims.

Our invention eliminates the unevenness of color in the final production products by permitting a testing of the emission of light during the manufacturing process and reduces a mounting area. None of these references provide a structure that would enable such advantages to be realized.

It is the Examiner's burden to establish *prima facie* obviousness. See *In re Rijckaert*, 9 F.3d 1531, 1532 (Fed. Cir. 1993). Obviousness requires a suggestion of all the elements in a claim (*CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003)) and "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). Here, we find that the Examiner has not identified all the elements of claim 1, nor provided a reason that would have prompted the skilled worker to have arranged them in the manner necessary to reach the claimed invention.

Ex parte Karoleen B. Alexander, No. 2007-2698, slip op. at 6 (B.P.A.I.
Nov. 30, 2007)

In summary, there has not been articulated a rational reasoning to support the legal conclusion of obviousness in view of the specific claim structure set forth in independent Claim 35.

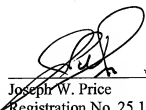
Accordingly, applicant submits that the present claims should be allowable and that the amendments proposed have reduced the number of issues for purposes of any appeal.

It is accordingly requested that the Amendment be entered and the case passed to allowance.

If the Examiner has any questions with regards to the prosecution of this case, the undersigned attorney can be contacted at the listed phone number.

Very truly yours,

SNELL & WILMER L.L.P.



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